

Application No. 09/882,734  
Amendment Date June 28, 2004  
Reply to Office action of June 23, 2004

### Amendments to the Claims

The listing of claims will replace all prior versions, and listings, of claims in the application:

#### Listing of Claims:

Claims 1-16 (canceled)

Claim 17 (currently amended): The A structure estimation module comprising:

- a. means to receive an image input;
- b. means to receive an application domain structure input;
- c. a preprocessing module that receives the image input having a pre-processed image output;
- d. a distributed estimation module that receives the pre-processed image and application domain structure inputs having an estimated structure output wherein the distributed estimation module comprises
  - i. a sub-region generation module having a sub-region output;
  - ii. a robust structure-guided estimation module that receives the sub-region output and a box caliper input having a feature parameter output wherein the box caliper robust structure-guided estimation module of claim 14 comprises:
    - (a) means to perform row-wise robust feature direction estimation and weight adjustment having an adjusted weight output;
    - (b) means to perform column-wise robust feature direction estimation and weight adjustment having an adjusted weight output;

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- (c) means to perform overall robust feature direction estimation and weight adjustment having a feature direction estimation result.

Claim 18 (currently amended): The A structure estimation module comprising:

- a. means to receive an image input;
- b. means to receive an application domain structure input;
- c. a preprocessing module that receives the image input having a pre-processed image output;
- d. a distributed estimation module that receives the pre-processed image and application domain structure inputs having an estimated structure output wherein the distributed estimation module comprises
  - i. a sub-region generation module having a sub-region output;
  - ii. a robust structure-guided estimation module that receives the sub-region output and a circle caliper input having a feature parameter output wherein the circle caliper robust structure-guided estimation module of claim 15 comprises:
    - (a) means to perform radial-wise robust center estimation and weight adjustment having adjusted weight output;
    - (b) means to perform angular-wise robust center estimation and weight adjustment having adjusted weight output;
    - (c) means to perform overall robust center estimation and weight adjustment having center estimation output.

Claim 19 (currently amended): The A structure estimation module comprising:

- a. means to receive an image input;
- b. means to receive an application domain structure input;
- c. a preprocessing module that receives the image input having a pre-processed image output;

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- d. a distributed estimation module that receives the pre-processed image and application domain structure inputs having an estimated structure output wherein the distributed estimation module comprises
- i. a sub-region generation module having a sub-region output;
  - ii. a robust structure-guided estimation module that receives the sub-region output and an arc caliper input having a feature parameter output wherein the arc caliper robust structure-guided estimation module of claim 16 comprises:
    - (a) means to perform radial-wise robust center estimation and weight adjustment having adjusted weight output;
    - (b) means to perform angular-wise robust center estimation and weight adjustment having adjusted weight output;
    - (c) means to perform overall robust center estimation and weight adjustment having center estimation output.

Claim 20 (original): A robust feature direction estimation and weight adjustment method for a group of box caliper sub-regions comprises:

- (a) for each sub-region, estimate the feature direction using line estimation without constraints;
- (b) for a group of sub-regions, estimate the feature direction using line estimation constrained by a parallelism relation;
- (c) compare the sub-region feature direction estimated in step (a), with the group direction estimated in step (b) and adjust weight for the sub-region based on an error function;
- (d) update and output the group of sub-regions box caliper estimate of the feature direction.

Claim 21 (original): A robust feature direction estimation and weight adjustment method for a group of circle caliper sub-regions comprises:

- (a) for each sub-region, estimate the center of a circular arc without constraints;

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- (b) for a group of sub-regions, estimate the center of circular arcs constrained by the same center point;
- (c) compare the sub-region center estimated in step (a), with the group center estimated in step (b) and adjust the weight for the sub-region based on an error function;
- (d) update and output the group of sub-regions center.

Claim 22 (original): A robust feature direction estimation and weight adjustment method for a group of arc caliper sub-regions comprises the following steps:

- (a) for each sub-region, estimate the center of a circular arc without constraints;
- (b) for a group of sub-regions, estimate the center of circular arcs constrained by the same center point;
- (c) compare the sub-region center estimated in step (a), with the group center estimated in step (b) and adjust weight for the sub-region based on an error function;
- (d) update and output the group of sub-regions estimate for the center of circular arcs.

Claim 23 (original): The method of claim 20 further comprising a step for re-alignment of the box caliper direction vector responsive to the group of sub-regions estimate of the feature direction output.

Claim 24 (original): The method of claim 21 further comprising a step for re-alignment of the circle caliper center location responsive to the output of the group of sub-regions estimate of the center of circular arcs output.

Claim 25 (original): The method of claim 22 further comprising a step for re-alignment of the arc caliper center location responsive to the output of the group of sub-regions estimate of the center of circular arcs output.